NON-PUBLIC?: N

ACCESSION #: 8903230335
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Virgil C. Summer Nuclear Station PAGE: 1 OF 5

DOCKET NUMBER: 05000395

TITLE: Reactor Trip on "A" Train Reactor Protection Due to Inadequate Procedure
EVENT DATE: 06/01/88 LER #: 88-007-01 REPORT DATE: 03/16/89

OPERATING MODE: 1 POWER LEVEL: 037

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
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COMPONENT FAILURE DESCRIPTION:
CAUSE: SYSTEM: COMPONENT: MANUFACTURER:
REPORTABLE TO NPRDS: N

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

On June 1, 1988, at 1004 hours, a reactor trip occurred while personnel were testing the "B" train solid state protection system actuation logic and master relay. Personnel in the control room were instructed to close the "B" reactor trip breaker from the main control board. When the control board switch was rotated to the close position, a signal interruption of the 48 volt undervoltage signal to the "A" reactor trip breaker and "B" bypass reactor trip breaker caused the breakers to open, resulting in a reactor trip from he "A" train solid state protection channel. Additional reviews have identified the source of the signal interruption to be a momentary opening of a contact in the undervoltage circuitry which occurs when the reactor trip breaker switch is taken to the lose position from the after-trip position.

The cause of the event has been attributed to inadequate procedures. Changes to a surveillance testing procedure made prior to the event did not require the reactor trip breakers to be closed using the main control board switch prior to startup. The following corrective actions were identified to preclude

recurrence:

1. Procedures were changed to ensure the reactor trip breaker is closed using the main c
ntrol board switch prior to plant startup.

2. Procedures now require individuals to perform closure manipulations of the breaker locally while at power.

3. Training was provided to applicable individuals to ensure the operation of the control room switch was understood.

4. A new precautionary label was placed at the reactor trip breaker switch on the main control board.

END OF ABSTRACT

PLANT IDENTIFICATION

Westinghouse - Pressurized Water Reactor

EQUIPMENT IDENTIFICATION

Reactor Protection System EIIS-JP

IDENTIFICATION OF EVENTS

Reactor trip on "A" train solid state protection caused by an inadequate procedure.

EVENT DATE

June 1, 1988 - 1004 hours

REPORT DATE

March 16, 1989

This report was initiated by Off-Normal Occurrence Report 88-031 and is a supplement to the original Licensee Event Report 88-007 dated July 1, 1988.

CONDITION PRIOR TO EVENT

Mode 1 - Reactor Power 37%

Reduced power due to in-progress condenser tube leak repairs.

Surveillance Test Procedure 345.074, "Solid State Protection System Actuation Logic and Master Relay Test for Train B," in progress.

DESCRIPTION OF EVENT

On June 1, 1988 at 1004 hours, operations and maintenance personnel were in the process of performing Surveillance Test. Procedure (STP) 345.074. This procedure tests the "B" train solid state protection system actuation logic and master relay. The "B" train reactor trip breaker had previously been racked out for testing. This configuration relies on the "A" reactor trip breaker and the "B" bypass reactor trip breaker for reactor protection. After the "B" main reactor trip breaker had been cycled satisfactorily in the test position, it was racked onto the bus. In accordance with the test procedure, personnel in the control room were instructed to close the "B" main reactor trip breaker from the main control board (MCB). When the control board switch was rotated to the close position, an interruption of the 48 volt undervoltage signal to the "A" reactor trip breaker and "B" bypass reactor trip breaker caused the breakers to open, resulting in a reactor trip from the "A" train solid state protection channel. The "B" main reactor trip breaker closed as expected, and was manually opened from the main control board as part of the immediate action for a reactor trip.

The signal interruption was caused by the momentary opening of a contact in the MCB switch as the switch travels from the after trip position to the close position. The output of each solid state protection system train is fed through the MCB reactor trip switch (contacts 5 and 7 in parallel for A train and contacts 15 and 17 in parallel for B train) to the undervoltage (UV) coils for the Reactor Trip Breakers (RTBs). Loss of voltage to the UV coil causes the RTB to trip open. If the switch is initially in the after trip position, then contact 5 (15) is open and contact 7 (17) is closed. As the switch is turned to close, contact 7 (17) opens before contact 5 (15) closes. This causes the UV coils to be momentarily de-energized resulting in the opening of the "A" RTB and "B" bypass RTB. Changes in testing due to verifying P-4 interlocks resulted in additional breaker manipulations while the plant was shutdown, and an auxiliary operator had been utilized locally to perform the manipulations. Since the RTBs are tripped using this switch as the plant is shutdown, the change in practice allowed the MCB switch to remain in the after trip position as the plant was restarted. Subsequent operation of the reactor trip switch to the closed position would therefore initiate a reactor trip.

CAUSE OF EVENT

The cause of this event has been attributed to an inadequate procedure. As a result of manufacturer recommendations, procedure changes that significantly increased the scope of testing and breaker manipulations had been instituted. Due to the expanded requirements, an auxiliary operator had been utilized to perform breaker manipulations locally and the MCB switch had been left in the after-trip position. Because the design of the MCB switch contacts was not understood, the procedure did not specify that the final breaker closure should be made from the MCB switch. Since the breakers are tripped using the MCB switch as the plant is shutdown, failure to reset the contacts by closing the MCB switch prior to restart connotes that subsequent MCB breaker closure attempts at power result in a reactor trip.

ANALYSIS OF EVENT

The consequences of this event were minimal. The "A" motor driven emergency feedwater pump started automatically, and the "B" motor driven emergency feedwater pump was started manually from the main control board since the "B" train solid state protection system was in the test position. The turbine driven emergency feedwater pump started automatically due to the low-low level setpoint on 2 out of 3 steam generators. Because of minor primary to secondary leakage in the steam generators, the turbine driven emergency feedwater pump-operation allowed a release of 0.32 microcuries of Iodine-131 and 57.1 microcuries of Tritium.

IMMEDIATE CORRECTIVE ACTION

Normal personnel response was initiated in accordance with Emergency Operating Procedure (EOP) 1.0, "Reactor Trip/Safety Injection Actuation."

Testing was initiated on the reactor trip breaker circuitry to determine the cause of the event.

ADDITIONAL CORRECTIVE ACTION

Initially the cause of the event was thought to be improper operation of the switch in that it was not taken to the full close stop. Notes concerning proper switch travel were added to the general operating procedures and a label containing the same instructions was placed by the switch on the MCB. The plant was then returned to power. Subsequently, indepth testing and investigations into the operation of the switch were conducted. As a result of the investigations, the design features of the switch were clearly identified. The following corrective actions were initated to preclude recurrence.

1. STP-345.039 was changed to have operators close the reactor trip breakers from the MCB switch at the completion of testing performed while the plant is shutdown. Note: STP-345.039 is the surveillance procedure that closes the reactor trip breakers during startup.

2. General Operating Procedures for plant startup were changed to instruct Operations personnel to close the reactor trip breakers from the MCB switch just prior to startup.

3. Surveillance test procedures were changed to require only local RTB operation when the plant is at power.

4. Operations individuals were instructed to not close the reactor trip breakers from the MCB switch (i.e., instructions are to perform all closures locally) while the plant is at power.

5. The label on the MCB above the reactor trip breaker switch was changed to read: "Use switch to close breaker per STP-345.039 only. Take the switch to the full travel position when closing breakers."

6. Training was provided to applicable individuals to ensure the operation of the control room switch was understood.

PRIOR OCCURRENCES

None

SCE&G 10CFR50.73

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March 16, 1989

Document Control Desk
U. S. Nuclear Regulatory Commission
Washington, DC 20555

Subject: Virgil C. Summer Nuclear Station
Docket No. 50/395

Operating License No. NPF-12
LER 88-007, Revision 1

Gentlemen:

Attached is Licensee Event Report No. 88-007, Revision 1, for the Virgil C. Summer Nuclear Station. This report is submitted pursuant to the requirements of 10CFR50.73(a)(2)(iv).

Should there be any questions, please call us at your convenience.

Very truly yours,

O. S. Bradham

AMM/OSB:lcd
Attachment

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